

A REVISION OF THE FUR MITES MYOBIIDÆ (ACARINA)

By Charles D. RADFORD, Hon. D. Sc., F. Z. S.

(MEMBRE CORRESPONDANT DU MUSÉUM D'HISTOIRE NATURELLE, PARIS)

INTRODUCTION.

Carl von HEYDEN (1826) established the genus *Myobia* for a species of mite which was parasitic on the house mouse (*Mus musculus musculus* L.) to which he gave the name *Myobia coarctata*. This was later found to be identical to the mite which Paul von SCHRANK (1781) described under the name *Pediculus muris musculi*. Under Article 2, International Rules of Zoological Nomenclature the scientific designation of animals must be binominal for species. The correct designation, therefore, for the genotype must be *Myobia muris-musculi* (Schrank, 1781) with *Myobia coarctata* Heyden, 1826 as a synonym.

Subsequent workers have described other species of this genus, all of which have been found as parasites of the Chiroptera, Insectivora and Rodentia. The main characteristics of these mites is that the first pair of legs have the tarsal segments modified to form a clasping organ, generally a recurved, broadly expanded claw whose inner surface bears a number of ridges which enable the mite to maintain a firm hold on the hairs of the host. There are also one or more processes — generally an opposed thumb-like organ and one or more chitinized plates which appear to serve as accessory hair-clasping processes. The dorsal surface is generally provided with four longitudinal rows of spines, two lateral and two sub-median. In some genera these are stout and simple, in others they are broadly foliate at the base and taper to a long, whip-like distal end. The body is flattened dorso-ventrally, and is very weakly chitinized.

Eyes are absent. Legs II, III and IV are spaced more or less evenly down the lateral edge of the body. On the posterior end of the body there is a pair of long, whip-like, terminal bristles approximately as long as the body, sometimes longer. Sexual dimorphism usually well pronounced.

In 1835, C. L. КОСН described the second species *Myobia lemnina* but mistakenly placed it in the genus *Dermaleichus* — a genus of feather mites of the *Analgesidæ*. This species was found upon the field vole (*Microtus agrestis hirtus* Bellamy). In 1877 P. ΜΕΓΣΙΝ established the family *Myobiidæ* for the genus. New species were

subsequently added by HALLER, 1882; MICHAEL, 1884; BERLESE et TROUESSART, 1889; TROUESSART, 1895; POPPE, 1896 and 1908; BANKS, 1909; VITZTHUM, 1914; RADFORD, 1934, 1935, 1936 *a*, 1936 *b*, 1938; FOX, 1937.

EWING (1938) published his revision of these mites and proposed the sub-family *Myobiinæ* being apparently unaware of the establishment by MÉGNIN of the family *Myobiidæ* in 1877 and the use of the name *Myobiidæ* by MICHAEL in 1884. EWING in his studies of the American species of this family found several morphological differences which warranted the establishment of three new genera for which he proposed the names *Amorphacarus* a monotypical genus with *Myobia elongata* Poppe, 1896 as the genotype; *Protomyobia* a monotypical genus with *Myobia claredei* Poppe, 1906 as the genotype, and *Radfordia* with *Myobia ensifera* Poppe, 1896 as type and having other included species. In this paper EWING described a number of new species but had not the opportunity to examine all the known species which had been described by previous workers.

Further species have been described by RADFORD, 1940; WOMERSLEY, 1941; MEILLON et LAVOPIERRE, 1944, and TURK, 1945 in ignorance of the paper by EWING (1938), which has meant the placing of all these species in the genus *Myobia*. In the years 1944-45 the present author was fortunate in obtaining additional material for examination containing some of the known species plus a number of new species, the latter being described in this paper. From these studies it became apparent that a fresh revision of the family was necessary so that these later species could be placed in their correct genera. Using EWING's paper as a basis it was found that the establishment of four new genera was necessary for which the following names are here proposed — *Calcarmyobia* a monotypical genus having *Myobia rhinolophia* Radford, 1940 as the genotype; *Neomyobia* with *Myobia rollinatti* Poppe, 1908 as the type and to include *Myobia pantopus* Poppe et Trouessart, 1895, *Myobia poppei* Trouessart, 1895, *Myobia plecotia* Radford, 1938, *Myobia pipistrellia* Radford, 1938, *Myobia jacksoni* Radford, 1940 and *Neomyobia fortuitous* sp. n.; *Ewingana* a monotypical genus with *Ewingana bispinosa* sp. n. as the genotype; *Foliomyobia* with *Myobia chiropteralis* Michael, 1884 as the type and including *Myobia mystacinalis* Radford, 1935 both of which are parasitic on bats.

Life cycle or population studies in the family *Myobiidæ*, if conducted, have not been published, and descriptions of new species have, in the main, been concerned only with the adult stages. FAHRENHOLZ (1908, p. 360) gives measurements of 0,188 mm. by 0,078 mm. for the ova of *Radfordia oudemansi*, (Poppe, 1908). The larvae of *Myobia muris-musculi* (Schrank, 1781) was described and figured by the present author (1934, p. 40) and in this paper

describes and figures the larva of *Myobia stewardi* sp. n.

Nymphs of *Radfordia oudemansi*, *Neomyobia rollinati* and *Radfordia lancearia* have been mentioned by FAHRENHOLZ (1908, pp. 362, 365 and 369 respectively). The nymphs of *Radfordia ewingi* (Fox) were described and figured by Fox (1937, p. 230). The present author has described and figured nymphs in the following species.

Myobia muris-musculi (1934, p. 40), *Myobia stewardi* sp. n. (in this paper), *Protomyobia elongata* (1935, p. 254), *Radfordia magna* (1935, p. 254), *Radfordia mystacinalis* (1936 a, p. 36), *R. blairi* (1936 b, p. 148), *R. davisii* (1938, p. 433), *R. brevihamata* (1936 b, p. 149), and *R. multivaga* (1936 b, p. 149-50), *Foliomyobia chiropteralis* (1936 b, p. 146).

BANKS (1909, p. 134) described a new species to which he gave the name *Myobia caudata*. In the same publication (p. 143) this mite was named *Myobia canadensis* and the synonymy was pointed out by the present writer (1936, p. 150) and later by EWING (1938, p. 197). From BANKS' figure it has not been possible to tell whether it was a male or female specimen and, in the absence of an adequate description or drawing some doubts have existed as to the identity of this species. EWING (1938, p. 197) considered it to be a female because of the preponderance of this sex in collections.

Through the kindness of Dr Edward W. BAKER, U. S. National Museum, Washington the type specimen was borrowed from the Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts. Dr BAKER made a camera lucida sketch of this specimen and from this sketch the present description and figure have been made. Dr BAKER also furnished me with camera lucida sketches of the type specimens of *Radfordia ewingi* (Fox, 1937), *Myobia longa* Ewing, 1938; *Radfordia inæqualis* Ewing, 1938 and *Radfordia floridanus* Ewing, 1938.

From the U. S. National Museum, Washington I have received duplicate slides of *Myobia simplex* Ewing, 1938 and *Radfordia subuliger* Ewing, 1938.

The species *Radfordia zibethicalis* (Radford, 1936 a, p. 34) was described from the holotype male taken on a specimen of the musk rat (*Ondatra zibethica zibethica* L.) taken at Blackford, Perthshire, Scotland by T. WARWICK. Dr R. W. STRANDTMANN, Medical Entomologist, University of Texas Medical School, Galveston, Texas has very kindly given the author specimens of the male and female of this species, thus enabling the presentation here of the description and figures of the female which, until now, has been unknown. The species herein named *Radfordia sigmodontis* sp. n. was also received from Dr STRANDTMANN as well as a female of *Myobia longa* Ewing, 1938.

Through the kindness of Dr Karl VIETS, Bremen, Germany arran-

gements were made whereby the author has been able to borrow the Fahrenheit collection of *Myobiidæ* deposited in the Celle Museum, Germany.

I wish to offer my thanks to Dr Edward W. BAKER, Division of Insect Identification, U. S. National Museum, Washington, U. S. A. ; Dr Henry E. EWING, of the same institute ; Dr R. W. STRANDMANN, Galveston, Texas ; Dr Karl VIERS, Bremen, Germany and Dr F. WACHSMUTH, Celle, Germany for their kind donations or the loan of specimens which have enabled me to add to the scope of this paper.

Figures 5 to 8 ; 65 ; 82 to 91 are made from the camera lucida sketches supplied by Dr BAKER. All the others are originals from specimens in the author's private collection or from the loaned specimens. The original drawings have been made with the aid of a squared eyepiece.

Key to the genera of MYOBIIDÆ Mégin, 1877.

- 1. { Leg I with three segments and tarsal claw ; dorsal spines foliate ; a stout tumb-like process on each side of capitulum dorsally ; tarsus II, III and IV each with two stout claws. **Calcarmyobia** gen. nov.
- 1. { Leg I with three or four segments and without tarsal claw ; tarsus II with one or two claws. 2
- 1. { Leg I with five segments and tarsal claw ; tarsus II, with two claws 2
- 2. { Tarsus II with one claw. *Myobia* von Heyden, 1826
- 2. { Tarsus II with two claws 3
- 3. { Capitulum symmetrical ; legs I equal 4
- 3. { Capitulum asymmetrical ; legs I not equal *Amorpharacus* Ewing, 1938
- 4. { Lateral spines I single ; dorsal spines not foliate. *Radfordia* Ewing, 1938
- 4. { Lateral spines I single ; dorsal spines foliate. **Foliomyobia** gen. nov.
- 4. { Lateral spines I paired. **Ewingana** gen. nov.
- 5. { Dorsal spines not expanded or foliate ; tarsus III and IV with one claw *Protomyobia* Ewing, 1938
- 5. { Dorsal spines mainly foliate ; tarsus III and IV with two claws. **Neomyobia** gen. nov.

Family MYOBIIDAE Megnin, 1877
Suf-family MYOBIINAE Ewing, 1938
Genus MYOBIA von Heyden, 1826.

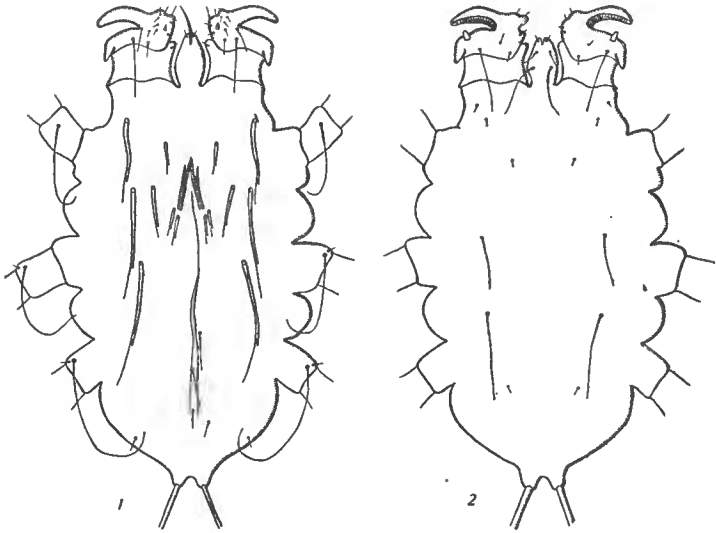
***Myobia muris-musculi* (Schrank, 1781).**

Pediculus muris musculi Schrank, 1781, *Enumeratio Insect. Aust. indeg* p. 501.
Myobia coarctata von Heyden. 1826, *Oken, Isis*, 19 : 6, 613.

Myobia musculina Gervais, 1844, in Walkenaer *Hist. nat. Ins. Apt.* 3 : 265.

Myobia musculi Claparede, 1869, *Z. Wiss. zool.* 18 : 519.

The male dorsum (fig. 1) shows the arrangement of spines. Lateral spines I, II and III long, barbed near their distal ends ; sub-median spines I and II shorter, barbed ; sub-medians spines III and IV flanking the genital pore. Median spine I level with the anterior edge of coxae IV ; median spine II level with the middle of coxae IV ;



Myobia muris-musculi (Schrank, 1781) ♂

FIG. 1., dorsum. — FIG. 2, venter.

median spines III and IV lying between median spine II and the posterior tip of the body. Lateral spines IV placed close to the lateral edge of the body, midway between legs IV and posterior tip of body. Genital pore placed between coxae II and III. Penis long and tapering, extending from median spine III to level of sub-median spine II. Leg I with a clasping tubercle and many small spines ; one stout, cone shaped spine and the usual arrangement of a long and a short spine directed backwards over the dorsum towards the posterior tip.

The male venter (fig. 2) has three pairs of spines on the capitulum, the anterior pair small, the posteriormost being the longest. Two pairs of small spines are borne on the edge of the body anterior to coxae II ; one pair of small spines is placed level with coxae II.

Level with the anterior edge of coxae III is a pair of long, slender spines ; between coxae III and IV is a pair of slender spines almost twice as long as the preceding pair ; posterior to coxae IV is a pair of small spines. On the ventral surface of tarsus I there is a thumb-like, conical spur, a number of small spines and a long, slender spine directed posteriorly. Tarsus II, III and IV each bearing a single claw ; tarsal claw of leg II shorter and stouter than on III and IV.

The female dorsum (fig. 3) has lateral spines i broad at base ;



Myobia muris-musculi (Schrank, 1781) ♀

FIG. 3, dorsum. — FIG. 4, venter.

lateral spines II long, stout and barbed ; lateral spines III sub-similar to lateral spines II ; lateral spines IV posterior to coxae IV, barbed. Sub-median spines I level with coxae II, barbed, not as long as lateral spines IV ; sub-median spines II posterior to coxae II, barbed, twice as long as sub-median spines I ; sub-median spines III level with coxae III, longer than I but shorter than II ; sub-median spines IV midway between coxae III and IV, barbed, about the same length as preceding pair ; sub-median spines V level with coxae IV, barbed. Anterior to the genital pore there are two pairs of long spines, with a row of four shorter spines posteriorly and the pair of genital claws. Flanking the anus there are three pairs of spines. Anterior to the long, terminal bristles is a pair of spines.

The female venter (fig. 4) has three pairs of spines on the capitulum. Chaetotaxy of the legs as figured. Anterior to coxae II are

three pairs of spines ; level with the posterior edge of coxae II is a pair of small spines ; posterior to coxae II is a pair of spines close to the lateral edge of the body. Anterior to coxae III is a pair of long spines flanked on the outside by a pair of small spines. Between coxae III and IV is a pair of long spines flanked on the outside by a pair of small spines. Close to the median line and anterior to the terminal bristles is a pair of short spines, with a pair of long, slender spines on the posterior tip, flanking the anus. Tarsus II, III and IV each with one long claw.

Type host : House mouse (*Mus musculus musculus* L.) Also recorded by POPPE (1896, p. 332) from the wood mouse (*Apodemus sylvaticus* L.). Found on laboratory white mice.

Type locality : Austria. Common on type host throughout its range.

Measurements : ♂ 0,27 mm. × 0,16 mm. ; ♀ 0,36 mm. × 0,2 mm.

***Myobia ethedredae* (Perkins, 1925).**

Acanthopthirius ethedredae Perkins, 1925, *Ann. Mag. nat. Hist.* (9), 16 : 175.

Myobia ethedredae (Perkins 1925), emend Radford, 1941, *Parasitology*, 33 : 3, 314.

Lateral spines I, II and III broadly foliate in basal half, with distal half long, whip like. Lateral spines I placed between coxae I and II their distal ends reaching coxae III ; lateral spines II close to posterior edge of coxae II their distal ends reaching middle of coxae IV ; lateral spines III level with posterior edge of coxae III their distal ends reaching beyond posterior edge of coxae IV. Sub-median spines I are missing on the holotype ; sub-median spines II level with middle of coxae II ; sub-median spines III level with coxae III. These dorsal foliate spines are longitudinally striated, but it is difficult in the specimen to see the other dorsal spines of the sub-median rows. A transverse row of six spines is placed close to the posterior tip of the body.

Ventral chaetotaxy is difficult to see but a pair of very stout, striated spines is placed level with coxae IV and flanked laterally by a pair of long, simple spines. Only one long stout claw is borne on tarsus II, III and VI. Second segment of legs II, III and IV are provided with one or two stout spines, one on leg II pointing forwards.

Type host : Pipistrelle bat (*Pipistrellus pipistrellus* Schreber).

Type locality : Ely Cathedral.

Measurements : ♂ 0,5 mm. × 0,2 mm.

Holotype ♂ in the Nuttall Collection (N° 375) deposited in the British Museum (Nat. Hist.).

(à suivre).